

— SEEDS —

Survival or Servitude?

*Have the
multinational
seed
monopolies
already sown
our future?*

*Stay alert
and support
your local
seed bank.*

by Ken Corbitt

THE GLOBAL SEEDS CONSPIRACY

Total control of the world's seeds—and ultimately the survival of mankind itself—is now in the hands of an elite cartel of multinational corporations. Complicitous governments worldwide are enacting Plant Breeders' Rights legislation to enforce the seed monopolies, with six-month jail terms and fines of \$250,000 for breaching patents or not paying royalties.

Global biodiversity is under grave threat as genetically-engineered seeds—tolerant to herbicides, 'designer-gened' and primed for profits—replace heritage seeds.

'Seed-saver' networks and conservationists in many nations are fighting a grassroots action to protect natural and regional plant varieties from extinction and to alert the world to the threat of control of the world's food supply, genetic manipulation, and laws that will allow the process patenting of all plants, animals, fungi, genes and viruses.

The world seeds market will be worth US\$28 billion by the year 2000, yet only a handful of major players—mainly petro-agri-chemical multinationals—will reap the rewards.

Less than 20 major corporations now control global seed supplies; many are seeking patents on any newly-developed hybrids or those produced by transgenics (genetic engineering, or GE).

Multinationals have acquired 1,000 seed and plant-breeding companies since 1970; in the 1980s alone they invested a staggering US\$10 billion on company acquisitions.

The world's largest seed company, Pioneer Hi-Bred International, holds 40 per cent of the US market in hybrid corn seed, around 50 per cent of the markets of Spain, Austria and Italy, and 90 per cent in Hungary and Egypt. Pioneer Hi-Bred also leads the seed market in Brazil, Thailand, the Ukraine and a large number of developing countries.

Imperial Chemical Industries (ICI) is the largest chemical conglomerate in the United Kingdom, and is now one of the world's biggest seed-suppliers. ICI became one of the major players on the US market in just five years: with the assistance of fellow UK giant British Petroleum, ICI swallowed up 11 of the largest seed companies from 1985-1990.

W. R. Grace, DeKalb Shand, Monsanto and Cargill control the majority of other seed and plant-breeding companies in the Americas.

French seeds giant Groupe Limagrain competes for European seed domination with ICI, Ciba-Geigy, Shell, Rhône-Poulenc, Bayer, Pfizer (linked with deKalb), Hoechst and Pioneer Hi-Bred International.

In Australasia and Oceania, ICI (Pacific Seeds) does battle with Pioneer Hi-Bred, DeKalb Shand, Cargill, AgSeed (a Limagrain company), Yates, New World Seeds and Seedco.

Asia and Africa are also in the hands of the major US and European multinationals.

Intense lobbying by the seeds cartel at the Uruguay Round of negotiations of the UN General Agreement on Tariffs and Trade (GATT) paid off: countries under the International Convention for the Protection of New Varieties (UPOV) are enacting Plant Breeders' Rights (PBR) bills and launching them on unsuspecting communities around the world.

Academics and civil libertarians have condemned the bills and the awarding of process patent rights that offer the multinationals absolute control over not only initial seed varieties but any derived plants, plus all transgenic and hybrid varieties they can produce.

The patent laws will demand royalties from growers, while the seed companies have the ultimate power over mankind: control over what we eat, when we eat—or if we eat at all.

Even more frightening is the awesome capability that transgenics gives to these corpo-

rate-state alliances: seeds are being genetically engineered to be resistant to chemicals, rotting, bacteria, and to drought, fire or flood.

Australian ecoscientist Richard Hindmarsh believes biotechnology and plant breeders' rights in the hands of a corrupt corporate-state monopoly is the recipe for a 'Brave New World' of genetic manipulation, and corporate enclosure of the DNA commons.

He says that the so-called 'Green Revolution' of the late 1960s/70s was a ploy not only to make the Third World reliant on agrichemicals and hybridised seed, but to 'steal' as many plant varieties as possible for their patented seed banks.

And the new power-push for breeders' rights and seeds control is just another item on the agenda to world domination. The facts bear this out: the Rockefeller Foundation, often linked to the New World Order, provided US\$90 million to fund research into molecular biology, the basis of genetic engineering from the 1930s to 1959. It helps fund the Philippines-based International Rice Research Institute (IRRI), which is still suffering its Green Revolution failures—as are the farmers. The same Rockefeller Foundation also collected the seeds of 95 per cent of the Earth's major cereal crops—wheat, barley and corn—in the years leading up to the GATT treaty and Plant Breeders' Rights bills.

So while the world's seeds are stored in frozen gene banks, the natural varieties in the Third World countries can be slowly 'phased out', leaving the farmers reliant on expensive, hybridised seed that can't re-grow viable seeds, requires large amounts of chemicals and ultimately sends the small farmers broke.

As Richard Hindmarsh sees it: "It's just another tool of DNA Incorporated."

BIODIVERSITY UNDER THREAT

UN Food and Agriculture Organisation statistics estimate that 75 per cent of genetic diversity in agricultural crops has been lost this century; the remaining quarter is now in great jeopardy.

The British experience provides clear evidence of the effect of plant variety rights and creation of seeds monopolies; the future does not augur well for the world's shrinking biodiversity.

In England, at least 1,500 vegetable varieties disappeared from the market within a few years of the National List being established. Already, farmers are before the courts for defying patent rights by growing or re-planting seeds not on the National List of approved species.

The high cost of testing procedures and annual registrations means individuals cannot afford to register seed varieties: only the multinationals can, and they are simply not interested in retaining plant species they do not have rights to, or cannot control through hybridisation or transgenics.

Developing countries will be hit hardest by the seeds monopolies: with few seed banks and a dearth of government support, they are at the mercy of the seeds cartels.

The tropical and sub-tropical areas of the world are the cradle of plant biodiversity; most major food crops originated from these regions. In these areas of high biodiversity, plant breeders find the necessary genes to develop stronger, healthier varieties of staple foods.

Hybridised, high-yield crops have been forced on the developing countries by the big corporations to the detriment of hardier

local plant types. This has already led to disastrous consequences: in Turkey, a seed monopoly by a German company led to the destruction of the sugar crop as local varieties were wiped out by an introduced hybrid unsuited to the conditions; and Indian rice crops were decimated when the cartels sold farmers hybridised short-stem rice that grew poorly, poisoned the irrigation channels and the fish that bred in them, proved useless for thatching and indigenous craft, and could not be re-grown from seed.

A million Indian farmers last year took to the streets to object to the awarding of a US patent for the active genes of the neem tree, used for centuries as a freely-available herbal remedy.

Indeed, farmers in many countries across Europe as well as in Japan, South Korea and the USA, staged mass protests against the provisions of the GATT treaty, and protests are also being made over the plant-breeders' rights issue.

While some conservation and seed-savers' groups started to take up the fight against the multinationals in developed countries from the mid-1970s, it is only recently that they've added renewed vigour to their campaigns—if already not too late...

AUSTRALIA—A GENETIC ENGINEERING HOTBED

Australia, as one of the world's major primary producers, has been at the forefront in the development of genetically-engineered seeds.

Last year the government funded biotechnology to the tune of A\$120 million—A\$30 million of which went to the Commonwealth Scientific and Industrial Research Organisation (CSIRO) which has been concentrating on seed genetics and transgenics for at least 20 years.

In Australia as well as overseas, scientists are still debating the safety of releasing genetically-engineered organisms (GEOs): bioscientists in the main claim they are safe; ecologists and ecoscientists claim they are a greater risk than the exotic species, such as cane toads, etc., that have already caused so

much ecological damage in Australia.

Australia was the first country to approve for the market-place a GEO—a recombinant DNA biopesticide called NoGall, to control crown gall disease. The UK has just approved a rapeseed oil tolerant to chemical giant Hoechst's herbicide Basta, and Europe has approved Rhône-Poulenc's bromoxynil-resistant tobacco.

In March 1994, Qld conservation groups discovered that a small-scale field test of a genetically-engineered microbe was being conducted by the Department of Primary Industries in far north Queensland. The microbe was modified by gene-splicing and is designed to prevent attacks of bacterial wilt on the roots of potato, tomato and tobacco plants. While conservationists protested against the dangers of such a bacterial release, Australia's Genetic Manipulation Advisory Committee said the bug presented no risk to the environment or public health.

Recently, the CSIRO Division of Plant Industry entered into a joint venture with Groupe Limagrain to produce transgenic plants to yield hybrid seed resistant to disease and viruses, for the lucrative Chinese market. Last year, multinational food consortium Coca-Cola-Amatil funded CSIRO field trials into virus-resistant, transgenic potato plants.

Scientists estimate that the global market for transgenic biopesticides could exceed US\$8 billion a year; developing plants to tolerate herbicides could be worth US\$6 billion; and the entire mar-

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ket for genetically-engineered plant varieties could top US\$14 billion.

Using gold-and-tungsten-tipped micro-bullets just 1,000th of a millimetre across and coated with DNA, CSIRO scientists are able to shoot 'designer' genes into wheat seeds. The bullets also contain a marker gene for herbicide resistance: the CSIRO claims it is solely a 'success indicator' for field trials—the wheat is sprayed with herbicide and only the transgenic plants will survive.

This is a major breakthrough as it is the first successful gene-splicing of a cereal crop: until now, wheat had required laborious cross-breeding to breed out the many undesirable genes that result from hybridisation. A Queensland University team, led by Professor Ken Scott, developed the micro-pellet gun technique with the assistance of multinational giant DuPont which designed the method.

Another process, developed with Chinese microbiologist Dr Ding Gang He, involves passing an electric current through the seed to open the pores of the wheat protoplasm enough to allow foreign DNA cells to enter.

The techniques are set to revolutionise world agriculture by allowing the creation of tailor-made food crops.

CSIRO researchers have already spliced a tobacco plant gene into sheep. This causes its sweat glands to secrete chitinase, an enzyme that kills blowfly larvae by dissolving the chitin that protects an insect's endoskeleton.

One of the most scandalous incidents involving transgenics occurred in Australia from 1988-90. Drs Bob Seamark and Julian Wells from an Adelaide University team attempted to develop transgenic pigs by splicing in an extra growth hormone gene that would lift the animal's food-conversion efficiency by 30 per cent: the pigs grew faster, yielded fat-free pork, and were able to reach market weight seven weeks earlier than usual.

Metro Meats, the university's commercial partner in the scheme, later sold the transgenic pigs to an abattoir from where the meat was then distributed and sold through Adelaide butcher shops. Consumers were not informed and it took two years for the truth to emerge.

The outcry from anti-genetic engineering and animal rights activists led to a public inquiry which found that the original transgenes had failed to function, so the pigs bred from those originally genetically manipulated were, in fact, not transgenic. This was merely coincidental.

Australia's two largest breweries—Tooheys, and Carlton & United—have funded the development of transgenic yeasts that can offer low-calorie beer. These yeasts are expected to be in use by the year 2000. Meanwhile, rennin made with transgenic bacteria is already being used in cheese production.

Multinational chemical giant Unilever has conducted trial plantings of a transgenic tomato developed in the United Kingdom by Zeneca Seeds, and is now conducting similar trials in Australia through its subsidiary, Unifoods Ltd. Unilever wants to develop long-shelf-life, out-of-season, anti-rot tomatoes for the lucrative North American and Asian markets.

Just last May, biotechnology company Calgene also launched its anti-rot "Flav'r Sav'r" transgenic tomato onto the Californian and Chicago markets—and has plans to make it available in Australia before too long. The tomato is claimed to stay fresh on the plant

and last up to two weeks after picking. After five years of scrutiny, the US Food and Drug Administration (FDA) recently approved the tomato, announcing it "as safe as tomatoes bred by conventional means".

The Australian push for genetic engineering came from the country's desire to be at the forefront of high-tech or 'sunrise' industries. It established one of the world's first Genetic Manipulation Advisory Committees in 1975, made up of scientists and academics from the CSIRO, the Australian Academy of Science and leading universities.

Intense lobbying from biotechnologists led to the Australian government creating the National Biotechnology Program Research Grants Scheme. Last year, the government handed over A\$100 million for research into genetic engineering.

Half of the CSIRO's divisions now include work on genetic engineering. More than 120 projects costing A\$30 million and employing 200 scientists were carried out in 1988 alone; more than 70 per cent of projects involved agricultural transgenics.

This contrasts markedly with the paltry A\$200,000 spent in Australia last year on research into organic or chemical-free agriculture.

PATENT IT—AND RULE THE WORLD

The same Rockefeller Foundation also collected the seeds of 95 per cent of the Earth's major cereal crops—wheat, barley and corn—in the years leading up to the GATT treaty and Plant Breeders' Rights bills.

The international cotton industry is still reeling from the US government's decision in 1992 to award process patent rights for all transgenic cotton to American biotechnology company Agracetus, on behalf of chemical and nuclear multinational W. R. Grace. Europe also has just granted the patent.

Patents are pending in the major cotton-producing nations of India, Brazil and China. The all-encompassing patents will give Agracetus-Grace a world monopoly on any new varieties of cotton regardless of the GE technique used in its development. All major cotton-producing countries will be forced to pay big royalties to use the

new cotton seeds; growers will be lured to return to high-velocity and aerial spraying so they can maximise returns on their herbicide-resistant crops.

Another US seed company, Delta & Pine Land, has commissioned Calgene to develop a transgenic cotton that will be resistant to the market-dominant broad-spectrum herbicide, Roundup, produced by Monsanto.

In March 1994, Agracetus-Grace was also granted a process patent in Europe, and has applied for one in the US as well, for all transgenic varieties of soyabean—the first attempt to gain total control over a staple food crop. The soyabean industry is worth US\$27 billion annually worldwide; the US dominates half the market, with Europe a minor supplier. If approved, the patenting of soyabeans will open the door to breeding rights for all major foods—rice, maize, beans and peanuts.

Agracetus used its own version of the DuPont micro-pellet gun technique to genetically engineer soyabean seeds. In 1992 when awarded patent rights on all transgenic cotton, Agracetus had used the standard GE techniques of using the bacterium *Agrobacterium tumefaciens* to ferry the foreign genes into the plant.

The breadth of the patent rights on cotton and soyabean extends to all genetically-engineered variants, regardless of the technique employed. Both patents are under attack from agricultural and

conservation groups, liberals and intellectuals, for their far-reaching economic and ecological implications.

Canadian/US lobby group Rural Advancement Foundation International has launched a formal challenge to the soyabean patent.

Although US Congress is yet to ratify the 1991 UPOV Convention, bills are pending to amend the plant variety protection laws to bring them into line with other UPOV countries. Yet, corporations large and small have been able to take advantage of the sweeping powers already available under US patent laws.

Earlier plant variety acts offered some protection to farmers and other seed-users. The new Plant Breeders' Rights bills and strengthened patent rights offer no such protection: the once inalienable right of farmers to save seed is under threat, with the big corporations holding all the aces.

At the time of going to press, the Plant Breeders' Rights Bill was still before the Australian Senate. To voice your concern on PBR, plant patenting and transgenics, contact your local Member of Parliament or any of the groups listed at the end of this article.

FARMERS' RIGHTS IN JEOPARDY

"Elimination of farmers' rights to save and sell limited quantities of seed is a threat to global conservation and enhancement of plant biodiversity," maintains Hope Shand of Rural Advancement Foundation International.

"The revised UPOV Convention opens the door for a future ban on all farm-saved seed. Farmers' rights to save seed has been made optional; this is a time-honoured, inalienable right.

"Although the seed industry claims it would be impossible to enforce such a ban on farm-saved seed, it should be noted that US-based seed corporations have already brought suit against more than 20 soyabean farmers for alleged abuses."

Shand believes the danger is that intellectual property rights (patenting), without reciprocal benefits for developing nations, could set up formidable barriers to accessing the world's genetic resources. She claims there is a far greater understanding of the ramifications of GATT and plant-breeders' rights in Third World countries than in the industrialised world.

"Consider, for example, the non-violent protests of over one million Indian farmers in recent months, who object to the plant intellectual property provisions in the GATT accord. These farmers are angry because they don't want to pay royalties on seeds and other products that they believe were developed using their own genetic resources and knowledge."

According to Shand, the UPOV proposals to extend proprietary protection to harvested materials of patented or protected varieties, also have major implications. All grain grown from protected seeds come under Plant Breeders' Rights; this gives the plant-breeder the power to restrict imports and exports of protected varieties and products if produced without authority. Seed companies could restrict entry into a UPOV-governed country of farm products coming from non-UPOV countries; they could also prevent food aid shipments of protected seeds from going to a Third World country that doesn't recognise plant-breeders' rights.

Genetic engineering expert, ecoscience Richard Hindmarsh of Griffith University in Queensland, goes much further in his condemnation of PBR and the patenting of life-forms:

The agenda is clear: the chemical companies will win all ways—by owning the seed companies and by producing transgenic seeds resistant to their products.

"It is nothing short of bio-piracy by big corporations and governments—the consequences are frightening," said Hindmarsh, who has written a series of authoritative articles on transgenics and the seed monopolies.

"Control of the world's food supplies—in fact, the future of the Earth itself—is to be handed over to the multinationals.

"It's not surprising most of the big players in the seeds monopolies are chemical companies: they wish to genetically manipulate crops to be tolerant to their herbicides."

Monsanto is working with DeKalb to develop a wheat strain tolerant to its herbicide glyphosate (Roundup); Calgene is collaborating with Rhône-Poulenc to find a strain of corn tolerant to its herbicide, bromoxynil.

The agenda is clear: the chemical companies will win all ways—by owning the seed companies and by producing transgenic seeds resistant to their products. Aerial spraying of broad-spectrum herbicides will intensify the use of agricultural chemicals.

Organic and biodynamic farmers already have difficulty obtaining good seeds and making them grow successfully, because most commercial seed is grown with chemical fertilisers and bred for artificial fertiliser absorption.

Hindmarsh said the dangers of integrating the plant-breeding and seeds sectors into the stables of the petrochemical corporations were great.

"Stock of open-pollinated seed will be further eroded with the wide-scale application of transgenic seed. Genetic diver-

sity will diminish as monoculture intensifies and expands.

"Seeds genetically altered to tolerate biopesticides and herbicides threaten also to degrade ecosystems; significantly, the primary research area of the bio-barons is to make crops—and there are 27 already being worked on—tolerant to broad-spectrum herbicides like Roundup and 2,4-D."

Questioned on why Australia was so eagerly jumping on the PBR bandwagon, Richard Hindmarsh had no hesitation: "It's all part of the economic rationalists incorporating Australia into the corporate world economy at the expense of national sovereignty, our ecological and genetic diversity, and the disempowerment of local communities especially rural-based ones."

He was also keen to see people take affirmative action in the face of the onslaught of plant breeders' rights.

"Increased commitment to seed-savers' networks globally and locally is needed, as well as pressure on governments to contain the bio-revolution. Otherwise we are threatened with a genetically-engineered future that will draw its resources increasingly from the corporate-state proprietary-owned gene banks."

Bob Phelps is co-ordinator of the Gen-Ethics Network, a group attached to the Australian Conservation Foundation, and the country's leading opponent of PBR and genetic engineering.

Originally funded for its first three years by rock band Midnight Oil (led by environmental activist Peter Garrett) as a forum for discussion on genetic engineering, funding was taken over by the Australian government in 1991.

"Plant-breeders' rights have overridden our basic right to survival—to feed, clothe and provide shelter for our families," said Phelps.

"The 1994 Bill gives plant variety owners much wider and longer-lasting monopoly control over plants, algae, fungi and their

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products than ever before. It is a new law, different in scope and intent from the Act.

"The Plant Variety Rights Office and Department of Primary Industries and Energy want to create an industrial property regime that rewards transnational seed and agribusiness companies so well, they will rush to register new varieties in Australia. The Bill primarily serves such interests."

Phelps said the PBR Bill had the power to extend breeders' monopoly rights beyond the 20 years for trees and 25 years for vines, so that monopolies could become permanent. He was also concerned that farmers' rights to save seeds would soon disappear.

"It has been reported that after the Bill becomes law, cotton may be declared a species from which seed may not be saved.

"There is no democratic procedure for grower or community consent to end farm-saved seed."

Bob Phelps said that despite consistent lobbying, the Australian government had failed to offer adequate safeguards.

"It's a conspiracy between seed companies and governments to gain complete control over our lives."

SEED-SAVERS' NETWORKS GROW

Opponents of PBR legislation and the seeds monopolies have rallied to the cause of protection of plant genetic resources and biodiversity.

Seed-savers' networks have been formed in North America, Europe and Australasia, to maintain and build a collection of original, chemical-free seeds for use by home-gardeners, organic growers and small-acreage farmers.

The task of these groups and others like the Heritage Seed Curators' Association,

permaculture networks and agrarian groups, has been made more urgent with the adoption of Plant Breeders' Rights bills worldwide.

In USA, the Iowa-based Seed Savers' Exchange co-ordinates seed-saving programs in several states.

Canada's Heritage Seed Program is run by the Canadian Organic Growers.

The UK's Henry Doubleday Research Association has seed libraries and facilities to assist organic growing.

Germany has the Berlin-based *Gen-Ethisches Netzwerk* and Green Party, while Friends of the Earth and the Green Alliance are active in most European countries.

In Australia, The Seed Savers' Network is run by Michel and Jude Fanton out of Byron Bay, New South Wales. Mr Fanton said the network now has 2,000 members, while its seed bank now boasts almost 1,200 varieties.

While admitting the future of the world's seed and food supplies was bleak, he was optimistic that more private citizens would begin to save their own seeds.

"It's up to all of us to protect our lifestyle from being eroded," said Mr Fanton. "It's now vital we get in touch with the old people, to learn as much as we can about how to save seed, grow produce and support ourselves."

Small commercial seed companies like Eden Seeds, Heirloom Seeds, Phoenix Seeds, and Greenpatch Seeds in Australia are creating banks of organic, open-pollinated, non-hybrid seed. Catalogues give growers a wide choice of fruits, vegetables, flowers and other species, at reasonable cost.

All are committed to protecting natural varieties of seed and informing the public of the need to fight for their rights against PBR legislation, genetic engineering and patenting of seeds, genes and viruses. ∞

— CONTACTS —

AUSTRALIA:

Bay Seed Garden, PO Box 715, Busselton, Western Australia 6280; phone (097) 52 2513.

Eden Seeds, MS 316, Gympie, Queensland 4560; phone/fax (074) 86 5230.

Gen-Ethics Network, 340 Gore Street, Fitzroy, Vic. 3065; ph. (03) 416 2222, fax (03) 416 1767.

Heritage Seed Curators' Association, "Wombat Bluff", W-Tree via Buchan, Victoria 3885; phone (051) 55 0227.

Phoenix Seeds, PO Box 9, Stanley, Tasmania 7331; phone (004) 58 1105.

The Seed Savers' Network, PO Box 975, Byron Bay, NSW 2481; phone/fax (066) 85 6624.

NEW ZEALAND:

GATT Watchdog, PO Box 1905, Christchurch; phone (03) 366 2803, fax (03) 365 2919.

UNITED KINGDOM/EUROPE:

Henry Doubleday Research Association, National Centre for Organic Gardening, Ryton-on-Dunsmore, Coventry CV8 3LG, UK; phone (203) 30 3517.

USA/CANADA:

Rural Advancement Foundation International, PO Box 655, Pittsboro, NC 27312, USA; phone (919) 542 1396, fax (919) 542 2460.

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